

CLAIMS

I/we claim:

1. A fluid treating method comprising the steps of:

(a) forming a ring lamination by laminating a plurality of filtering rings with contact
5 surfaces facing each other in a laminating direction;

(b) providing at least portions of the contact surfaces of the filtering rings facing each other with a contact surface roughness (Ra) in a range of about 0.01 μm to 20 μm ;

(c) pressing the ring lamination under a contact surface pressure (p) in a range of about 0 to 177 kg/ cm² in the laminating direction of the filtering rings to cause the contact surfaces to closely
10 adhere to each other;

(d) directing an object fluid into gaps formed by contact surfaces of neighboring filtering rings of the ring lamination; and

(e) dividing the object fluid into a first separated fraction and a second separated fraction for separation.

15 2. The fluid treating method according to claim 1, wherein a distance (g) between the portions of the filtering rings closely adhering to and facing each other is in a range of about 0.2 nm to 200 μm .

3. The fluid treating method according to claim 1, wherein the filtering rings comprise a magnetic material.

20 4. The fluid treating method according to claim 1, further comprising a step of controlling accuracy and/or speed of the division and separation of the object fluid into the first separated fraction and the second separated fraction by adjusting a pressure difference $\Delta P = P1 - P2$ between a supply pressure P1 of the object fluid to an inlet area of the ring lamination and a suction pressure P2 acting on an exit area of the ring lamination.

25 5. The fluid treating method according to claim 4, further comprising the steps of: causing the suction pressure acting on the exit area of the ring lamination to act in a reverse direction in an initial stage of operation, and pressing the object fluid in the ring lamination by the reverse suction pressure acting on the exit area of the ring lamination and the supply pressure of the object fluid to the inlet area of the ring lamination.

6. A fluid treating apparatus for dividing an object fluid into a first separated fraction and a second separated fraction and separating these fractions, comprising:

a long and thin cylindrical housing;

a ring lamination formed by laminating a plurality of filtering rings facing each other;

5 a ring press for acting on the ring lamination to cause the filtering rings to closely adhere to each other under a prescribed pressure;

an object fluid supply for feeding the object fluid to the ring lamination; and

an object fluid pressure source for impressing a prescribed pressure onto the object fluid supplied to the ring lamination in cooperation with the object fluid supply.

10 7. The fluid treating apparatus according to claim 6, wherein the object fluid pressure source is a pump or a gate valve.

8. The fluid treating apparatus according to claim 6, wherein at least portions of contact surfaces of the filtering rings closely adhering to and facing each other have a contact surface roughness (Ra) in a range of about 0.01 μm to 20 μm .

15 9. The fluid treating apparatus according to claim 6, wherein the ring press presses the ring lamination under a pressure in a range of about 0 to 177 kg/cm².

10. The fluid treating apparatus according to claim 6, wherein a distance between contact portions of the filtering rings adhering to and facing each other is in a range of about 0.2 nm to 200 μm .

20 11. The fluid treating apparatus according to claim 6, wherein the filtering rings comprise a magnetic material.

12. The fluid treating apparatus according to claim 6, further comprising a stripper arranged in a center hole in the ring lamination to separate one of the fractions from the ring lamination.

25 13. The fluid treating apparatus according to claim 12, wherein the stripper is a rotary brush for removing solids adhering to an inner peripheral portion of the ring lamination.

14. The fluid treating apparatus according to claim 6, further comprising a ring lamination holder arranged in the housing, the holder having a plurality of openings and having the ring lamination arranged in the interior thereof.